

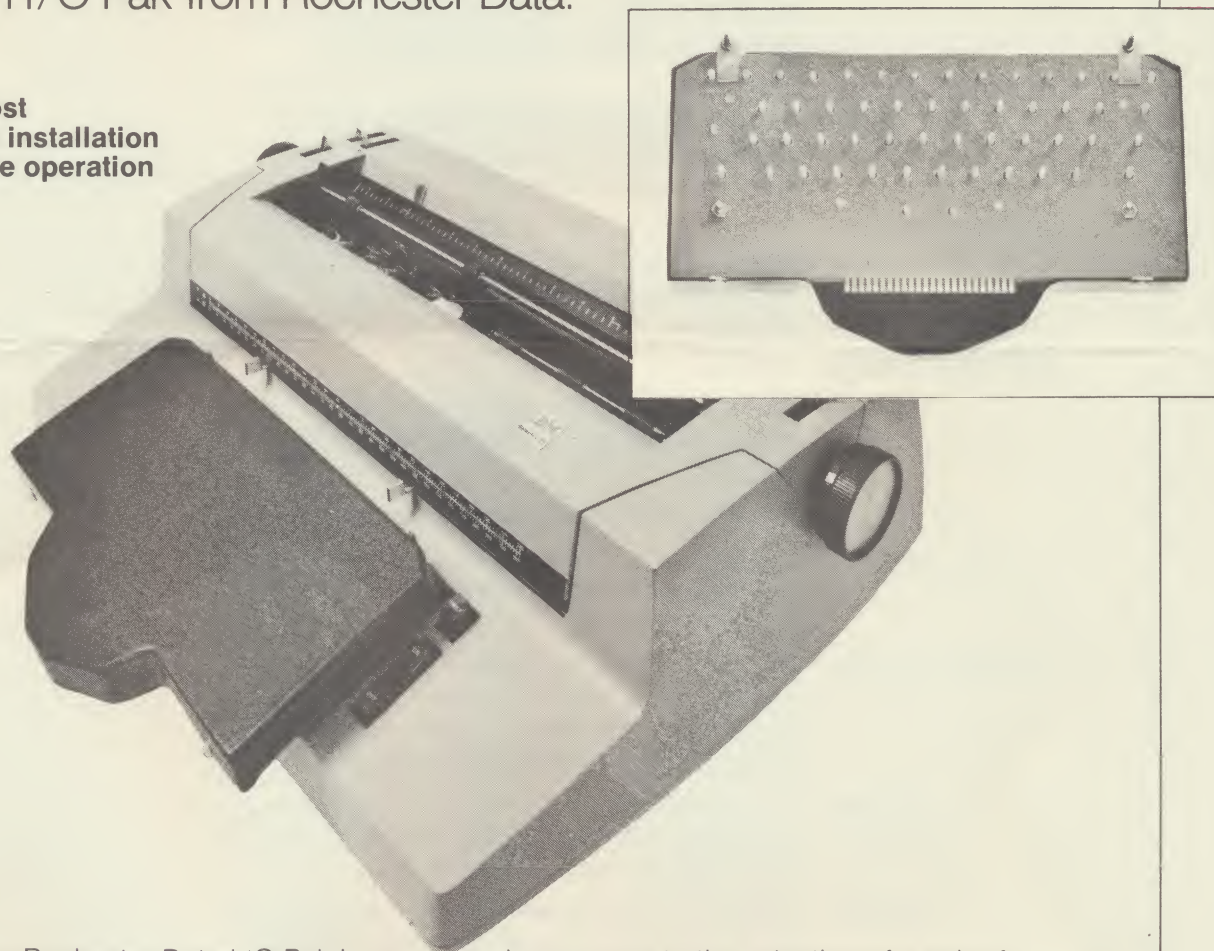
June 80

I/O Pak

Computer / Typewriter Mechanical Interface

Turn your electric typewriter into a high quality hard copy printer with an I/O Pak from Rochester Data.

- Low cost
- Simple installation
- Reliable operation



The Rochester Data I/O Pak is an electro-mechanical device designed to interface between a conventional powered carriage return electric typewriter and any digital computer configured with a suitable electronic interface. The unit consists of a bank of specially designed solenoids mounted in an array that fits directly over the keyboard of the typewriter. Energizing a specific solenoid causes the respective typewriter key to be depressed, thus printing a character. Electrical actuation of the solenoid is accomplished by self contained drive electronics that operate

in response to the selection of a pair of one-out-of-eight control lines.

The two models of the unit will operate virtually any electric typewriter that has powered function keys (carriage return, backspace, etc.) and a U.S. keyboard, with no mechanical modifications to the typewriter. All adjustments are self contained in the I/O Pak itself.

The unit features low profile, easy initial installation, instant detachability and replacement, modest power consumption and high reliability.

ROCHESTER DATA

Incorporated

3100 Monroe Avenue, Rochester, New York 14618

Specifications

Device	Electrically operated solenoid drive typewriter key actuator.
Typewriter	I/O Pak model 1—any IBM selectric with U.S. keyboard I/O Pak model 2—any powered function key portable or office typewriter with U.S. keyboard.
Keys	44 alpha numeric plus 6 function keys (carriage return, space, backspace, tab, case lock, case shift)
Installation Method	Attach two mounting caps with adhesive to typewriter body. Mount I/O Pak and adjust elevations screws for proper keytop activation.
Electrical Voltage	$\pm 18V$ min., $\pm 24V$ Max.
Current	500 ma average @ 10% duty cycle 5 amperes peak @ $\pm 18V$ when actuating solenoid
Duty Cycle	5% maximum for sustained operation
Actuate Time	Dependent on voltage and spring force of key. Approximately 6 milliseconds @ $\pm 20V$ with IBM selectric.
Electronic Drivers	8 X drivers by 8 Y drivers in a matrix configuration. Selecting one X driver and one Y driver actuates a unique solenoid for as long as the drivers are selected.
Coding	16 control lines (8 for X and 8 for Y) are provided. Connecting one X line and one Y line to ground selects a solenoid.
Interface	Designed to be driven directly from a pair of SN7445 binary to octal decoders. When so driven the unit operates from a 6 bit parallel code set.
Timing	Must be provided externally and adjusted to match the characteristics of the typewriter.
Physical Size	7.5" w x 11.5" h x 1.5" d overall.
Weight	3 lbs.
Environment	+ 5°C to + 35°C, 10% to 90% RH

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NCC "80"

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3100 Monroe Avenue, Rochester, New York 14618 (716) 385-4336

PRICE LIST

Item	Model	Price
I/O PAK		
Selectric	1001	\$459.00
Non-Selectric	1002	\$459.00
TRS-80 System		
Interface	2001	\$89.50
Power Supply w/5 volts	3001	\$55.00
Cassette	4001	\$15.00
	Total	\$539.50 \$499.
Apple System		
Interface	2000	\$79.50
Power Supply w/5 volts	3000	\$55.00
Cassette	4000	\$15.00
	Total	\$529.50 \$499.
General Purpose		
Interface	2002	\$79.50
Power Supply	3001	\$55.00
	Total	\$514.50 \$499.
Conversion Kit		
1001 to 1002	5000	\$15.00
1002 to 1001	5001	\$15.00

Shipping charges will be C.O.D. Send your check or money order along with shipping information to:

DELIVERY
STOCK TO 2 WEEKS

Rochester Data, Inc.
3100 Monroe Ave.
Rochester, New York 14618

Include make of typewriter and computer that will be used with unit.

Your check will not be cashed until one week prior to scheduled shipment.

Warranty: One year parts and labor-return to Rochester Data, Inc.

Thank you for your interest.

Very truly yours,

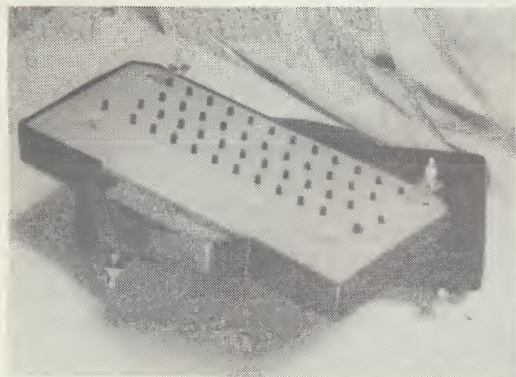
Rochester Data, Inc.

Robert A. Giese
Robert A. Giese

RS 232/CENTRONICS
SYSTEM PRICE \$699.
DELIVERY 90 - 120 DAYS

June 80

THE I/O PAK



I/O PAKS

NOTE—Red Plungers are shorter than white plungers

Q. What is the I/O PAK?

A. The I/O PAK consists of 52 solenoids (coils) riveted to a printed circuit board. A plunger is inserted and rests in each coil, extending out of the bottom of the printed circuit board. Each of the coils is actuated by selecting one X and one Y lead of a matrix. The I/O PAK mounts or rests on the typewriter by its own weight. Two $\frac{1}{8}$ " x $\frac{1}{2}$ " white plastic washers are taped to the typewriter (double-sided sticky tape) one on each side of the space bar. The I/O PAK has four adjustable mounting screws. The two lower ones rest in the washers. For normal typewriter use, simply lift the I/O PAK off. It can be replaced just as easily; *there are no other modifications* required to your typewriter.

The I/O PAK Design offers the following:

1. When traveling carry only the I/O PAK. There is usually a typewriter around, so simply mount the buttons on the typewriter at your destination and run (extra washers can be provided at no charge if requested with your order). The I/O PAK weighs 3 lbs., much better than carrying a printer around.
2. If your typewriter is under a maintenance agreement, you do not void that agreement since no mechanical modifications are made to your typewriter.
3. The I/O PAK will work on all typewriters, so you are not restricted to modifying one typewriter and carrying it around.

Q. How fast will it go?

A. The average typewriter will not go faster than 10-18 CPS. The I/O PAK can actuate the keys at up to 50 CPS but the

typewriter cannot keep up. The software allows you to change the speeds of all functions. You tune the speed to a value consistent with good output.

Q. Is it reliable?

A. The I/O PAK has been tested to over 10 million operations per key. Your typewriter, or commercial typewriter, is rated at around 50 million operations overall. The I/O PAK is not, strictly speaking, mechanical. It is electromagnetic. The only parts that touch are a plunger which is an integral part of a coil that is attached to the printed circuit board. If the coil

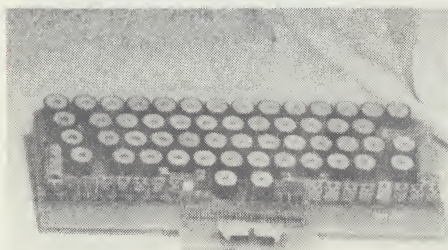
burns out simply remove it and drop in a new coil. Our interfaces have a one-shot timing circuit which sets the coil actuation time and is adjustable, so if your software locks up, the coil will not burn out. Parts are available at a nominal cost. If you prefer, send the unit back to us and we will repair it at a reasonable charge. (No charge for first year!)

Q. Tell me about the software?

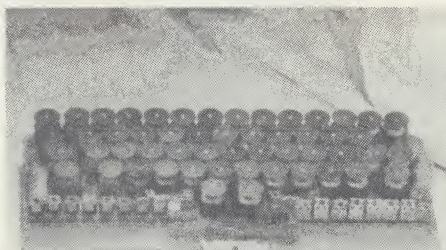
A. We have software for the TRS-80 and Apple. Both reside in upper memory, away from your programs and occupy about 500 bytes. The software will operate in all memory size machines and is available on disk and cassette. We have a relocatable program for 8080/Z80 based machines of

other architecture. This is available in a listing only. The software in the TRS-80 and Apple are self-prompting and permit you to adjust every conceivable typewriter timing variable. Once you have done this for your typewriter you can store the program.

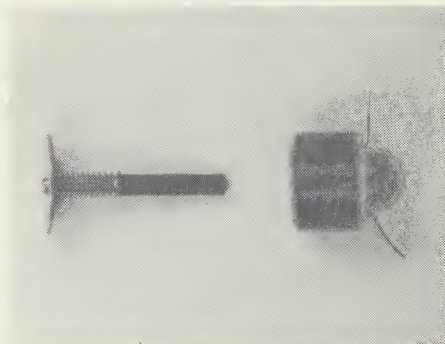
I/O PAK without cover or plungers



I/O PAK with plungers



Top: Plunger



Q. What is going on in your software—can't I output ASCII?

A. No, you cannot output ASCII. Our software looks at your ASCII characters as an address in a table and pulls two octal digits out, sending these to the I/O PAK interface. The interface takes one octal digit for an X line of the 8X8 matrix, the other as the Y line and outputs these to the I/O PAK which will energize that solenoid in that position. If you have a 'I

key on your typewriter it will output that matrix position, say 32 octal. If you use lower case 'L for a 'I insert octal 46 for an ASCII 'I in the software table and you will output lower case 'L when the software sees an ASCII 'I. These changes, plus upper and lower case, which are available for both the Apple and TRS-80, plus other features are standard.

Q. How come you don't have RS232?

A. Because RS232 interfaces transmit at a given baud (bit per second) rate, either 110, 300, 600, etc. Since there isn't any feedback from the I/O PAK, we can't control the 'clear to send' line. Also, the software would have to send nulls after carriage return, case shift, do the ASCII to matrix conversion and be adaptable for the case where you have a 'I key and where you use lower case 'L. RS232 implies ASCII output to

many people and in our case, it certainly doesn't apply. We're not saying that RS232 will never be available. We can see a smart RS232, but it would have to be for only one typewriter because of the 'I versus lower case 'L and similar keyboard configuration problems. We can also see a 'dumb' RS232 but it would be for specific machines that the software has been written for.

Q. Is the software compatible with the Electric Pencil systems?

A. Yes. Specify your license number with order and, for a nominal charge, we will send you a modified diskette.

Q. Will it fit my typewriter?

A. Yes—it will fit on all commercially available, powered carriage return typewriters sold in the United States. Specify Selectric or non-Selectric. The only difference is in the plunger length. A conversion kit (26 white plungers) is

available to convert between models. It takes 2 minutes to convert! If you still have doubts, we'll send you a template so you can check for yourself.

Q. Will it damage my typewriter?

A. The lower half of our plunger shaft is delryn. The delryn strikes the typewriter key. The nominal force required to actuate a typewriter key (shiftlock) is about 3 ounces. Our solenoids are designed to closely match the operating force of a normal typist. The delryn will not leave a mark on the keys. Incidentally, the average secretary will type at 65

words per minute or 325 characters per minute. Since the I/O PAK can drive your typewriter to the limit, say 15 CPS, you can generate 180 words per minute. We recommend you slow the I/O PAK down to a reasonable speed so as not to cause excessive mechanical wear to the typewriter.

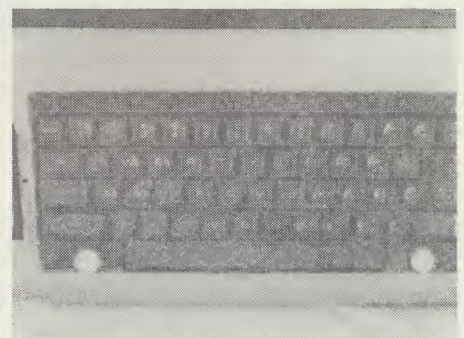
Q. What about all the other micro-computers on the market? When will you have an interface for them?

A. We are working on a CENTRONICS Interface. It will be available the third quarter of 1980. Also, a Pet Interface will be available the third quarter. Please let us know your

preference and we will contact you when these are available.

Q. How do I mount the I/O PAK?

A. The unit is shipped with a template. The template has an arrow which points between the 'B' and 'N' keys. When the arrow is placed pointing between the keys, the two holes in the template indicate where you place the 2 plastic buttons. Rest the bottom 2 adjusting screws on the I/O PAK into the buttons, remove the cover, and while adjusting the four adjusting screws manually push the plungers until they actuate the keys per our instructions. Replace cover, turn locknuts tight and run.



Washers on Typewriter

Mounting Washers

Q. What do I have to order?

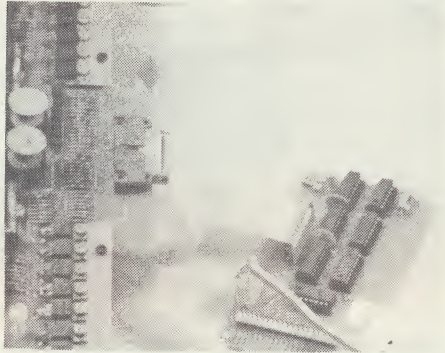
A. An I/O PAK, a power supply, interface and cassette or disk software.

INTERFACES

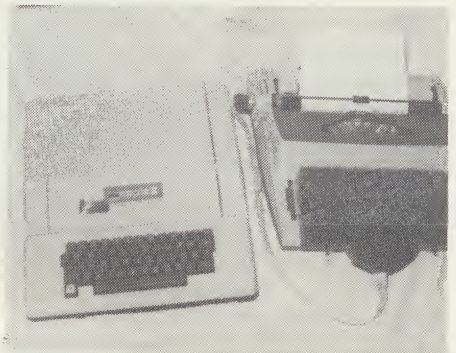
APPLE:

Plugs into any open slot in an Apple II Computer. The software provided by RDI is fully compatible with cassette and disk based APPLESOFT II or INTEGER BASIC.

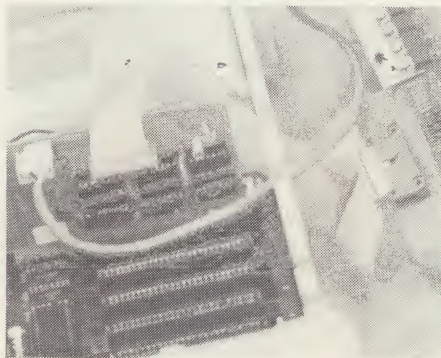
Interface connected to I/O PAK and Power Supply



Mounted I/O PAK and Apple Computer



I/O PAK plugged into Apple



Apple Interface



TRS-80

Plugs in via cable to the expansion connector (no TRS-80 interface needed) on the TRS-80 keyboard and offers a TRS-80 expansion connector to allow direct interfacing to other TRS-80 peripherals. The TRS-80 software provided by RDI is compatible with basic level II under the cassette or DOS System. (LPRINT/LLIST commands under Level II).

Interface connected to TRS-80



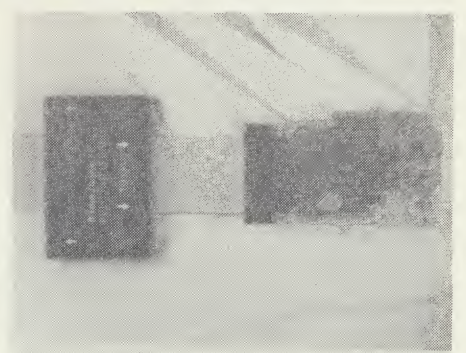
TRS-80 Interface



Interface with TRS-80 connector



Interface connected to Expansion Unit



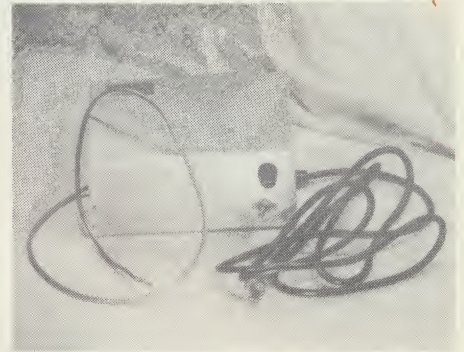
INTERFACES (con't.)

GPIB

The General Purpose Interface is designed to plug into an 8 bit output port or a 2708/2716 Prom Socket (when ordered with cable) in almost any computer. When ordered without cable, a 24 pin header is provided on the board. The GPIB accepts 3 Bits for X select, 3 for Y and one address latch bit which fires the on board one shot, which enables the X, Y output lines to the I/O PAK. When connected to the 2708/2716 socket, it enables you to operate the I/O PAK as a memory mapped output device. Our software drivers work with 6502, 8080 and Z80 Systems.

NOTE: The Apple, TRS-80 and GPIB Interfaces utilize the same printed circuit board and chips. Jumper modifications will permit operation for any of these three applications.

Power Supply



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